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New York, NY 10036-8402				
		EXAMINER		
		THOMPSON, CAMIE S		
		ART UNIT		
		PAPER NUMBER		
		1794		
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		11/25/2009		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/585,289

Applicant(s)

NAKAMURA, TAKESHI

Examiner

Camie S. Thompson

Art Unit

1794

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Amendment filed 9/9/09.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 6 and 8-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6 and 8-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB-06)
Paper No(s)/Mail Date 11/10/09
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. Applicant's amendment and accompanying remarks filed September 9, 2009 are acknowledged.
2. Examiner acknowledges amended claims 1 and 12.
3. Examiner acknowledges cancelled claims 4-5 and 7.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3, 6, 8-12 and 15-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Kameda et al., U.S. Patent Number 5,939,216.

Kameda discloses a fiber reinforced ceramic matrix composite that exhibits increased initial matrix cracking strength, crack propagation resistance and fracture energy and improved interlaminar strength (see column 2, lines 43-52). The reference discloses that the composite comprises a matrix sintered body formed of a silicon carbide ceramics derived by reaction sintering as per instant claims 7 and 16 (see column 3, lines 16-26). Kameda discloses that the composite comprises a ceramic matrix and a fiber preform wherein the fiber preform comprises a plurality of fabric elements comprising organic fibers used as auxiliary fibers and at least one ceramic fiber selected from silicon carbide fibers, alumina fibers, silicon nitride fibers and carbon fibers as per instant claims 3, 6 and 21-24 (see column 4, lines 16-33 and column 7, lines

17-26). It is disclosed in column 7, lines 1-9 that the ceramic fibers can be doubled together or blended together as per instant claim 1. It is also disclosed in column 7 that the auxiliary fibers adherent to the ceramic fibers are converted to SiC matrix so that the matrix can be sufficiently formed also around the ceramic fibers as per the present claims. The reference discloses that the fibers bundled together are present in volume fraction of 10 to 40% by volume in the ceramic matrix as per instant claims 17-19. Column 4, lines 1-10 discloses that the ceramic matrix can be formed from a combination of silicone carbide, silicon nitride, alumina and zirconia as per instant claim 8. The reference discloses that there can be more than one ceramic fiber used in the fabric. It is disclosed in column 2, lines 43-65 that the fiber fabric is assembled at a predetermined volume fraction of fiber in the ceramic matrix. It is disclosed in column 8, lines 45-53 that the starting matrix is a slurry as per instant claim 15. The examples in the Kameda reference discloses that the fibers are exposed to high temperatures as per instant claim 12. Example 4 discloses a plate-like specimen cut out of the composite with the resulting composite being highly dense.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kameda et al., U.S. Patent Number 5,939,216 in view of JP 10-194856.

Kameda discloses a fiber reinforced ceramic matrix composite that exhibits increased initial matrix cracking strength, crack propagation resistance and fracture energy and improved interlaminar strength (see column 2, lines 43-52). The reference discloses that the composite comprises a matrix sintered body formed of a silicon carbide ceramics derived by reaction sintering as per instant claims 7 and 16 (see column 3, lines 16-26). Kameda discloses that the composite comprises a ceramic matrix and a fiber preform wherein the fiber preform comprises a plurality of fabric elements comprising organic fibers used as auxiliary fibers and at least one ceramic fiber selected from silicon carbide fibers, alumina fibers, silicon nitride fibers and carbon fibers as per instant claims 3-6 and 21-24 (see column 4, lines 16-33 and column 7, lines 17-26). It is disclosed in column 7, lines 1-9 that the ceramic fibers can be doubled together or blended together as per instant claim 1. It is also disclosed in column 7 that the auxiliary fibers adherent to the ceramic fibers are converted to SiC matrix so that the matrix can be sufficiently formed also around the ceramic fibers as per the present claims. The reference discloses that the fibers bundled together are present in volume fraction of 10 to 40% by volume in the ceramic matrix as per instant claims 17-19. Column 4, lines 1-10 discloses that the ceramic matrix can be formed from a combination of silicone carbide, silicon nitride, alumina and zirconia as per instant claim 8. The reference discloses that there can be more than one ceramic fiber used in the fabric. It is disclosed in column 2, lines 43-65 that the fiber fabric is assembled at a predetermined volume fraction of fiber in the ceramic matrix. The examples in the Kameda reference discloses that the fibers are exposed to high temperatures as per instant claim 12.

Example 4 discloses a plate-like specimen cut out of the composite with the resulting composite being highly dense. Kameda does not disclose that the matrix is formed by CVI methods. The Japanese reference discloses a ceramic composite comprising a combination of higher elasticity fibers, SiC, with fibers having low elasticity, SiCO, in a ceramic matrix (see abstract). Reference claim 2 of the Japanese reference discloses that the ceramic matrix is produced by CVI methods as per instant claims 13. The Japanese reference discloses that the composite has increased crack propagation resistance. Therefore, it would have been obvious to one of ordinary skill in the art that the ceramic matrix of the Kameda reference could be formed by CVI methods since the Japanese reference uses CVI methods on the same ceramic matrix in order to achieve increased crack propagation resistance.

8. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kameda et al., U.S. Patent Number 5,939,216 in view of Yamaguchi et al., U.S. Patent Number 6,723,382. Kameda discloses a fiber reinforced ceramic matrix composite that exhibits increased initial matrix cracking strength, crack propagation resistance and fracture energy and improved interlaminar strength (see column 2, lines 43-52). The reference discloses that the composite comprises a matrix sintered body formed of a silicon carbide ceramics derived by reaction sintering as per instant claims 7 and 16 (see column 3, lines 16-26). Kameda discloses that the composite comprises a ceramic matrix and a fiber preform wherein the fiber preform comprises a plurality of fabric elements comprising organic fibers used as auxiliary fibers and at least one ceramic fiber selected from silicon carbide fibers, alumina fibers, silicon nitride fibers and carbon fibers as per instant claims 3-6 and 21-24 (see column 4, lines 16-33 and column 7, lines

17-26). It is disclosed in column 7, lines 1-9 that the ceramic fibers can be doubled together or blended together as per instant claim 1. It is also disclosed in column 7 that the auxiliary fibers adherent to the ceramic fibers are converted to SiC matrix so that the matrix can be sufficiently formed also around the ceramic fibers as per the present claims. The reference discloses that the fibers bundled together are present in volume fraction of 10 to 40% by volume in the ceramic matrix as per instant claims 17-19. Column 4, lines 1-10 discloses that the ceramic matrix can be formed from a combination of silicone carbide, silicon nitride, alumina and zirconia as per instant claim 8. The reference discloses that there can be more than one ceramic fiber used in the fabric. It is disclosed in column 2, lines 43-65 that the fiber fabric is assembled at a predetermined volume fraction of fiber in the ceramic matrix. The examples in the Kameda reference discloses that the fibers are exposed to high temperatures as per instant claim 12. Example 4 discloses a plate-like specimen cut out of the composite with the resulting composite being highly dense. Kameda does not disclose that the ceramic matrix is produced by the PIP method. Yamaguchi discloses a ceramic composite wherein the ceramic matrix is SiC with SiC fiber dispersed therein. Yamaguchi discloses a PIP treatment (see Yamaguchi reference claims). The PIP treatment affects fiber impregnation. Therefore, it would have been obvious to one of ordinary skill in the art to have the ceramic matrix, SiC, of the Kameda reference formed by a PIP method in order to increase the efficiency of fiber impregnation.

Response to Argument

9. Applicant's arguments filed September 9, 2009 have been fully considered but they are not persuasive. Applicant argues that the Kameda reference does not disclose or suggest the feature of the residual stress of a difference in the thermal elongation between the fiber bundles and the matrix phase is small when exposed to high temperatures. Kameda discloses that the matrix is comprised of SiC and the fiber bundles are made up of at least one of fibers selected from silicon carbide fibers, alumina fibers, silicon nitride fibers and carbon fibers. The phrase "at least one" includes more than 1 fiber and can be included as the main constitutional fiber and the auxiliary fiber. The present claims recite open language and can include organic fibers. Kameda comprises the same matrix as the present claims as well as the fibers required by the present claims. Kameda comprises the same composite as required by the present claims and it would be expected that the residual stress of a difference in the thermal elongation between the fiber bundles and the matrix is small when exposed to high temperatures. Additionally, applicant does not claim residual stress and applicant has not provided secondary considerations to show that the composite of the Kameda reference is different from the composite of the present invention. The rejections are maintained.

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Camie S. Thompson whose telephone number is 571-272-1530. The examiner can normally be reached on Monday-Friday 8:00 am - 6:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, D. Lawrence Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Camie S Thompson/

Examiner, Art Unit 1794

/D. Lawrence Tarazano/

Supervisory Patent Examiner, Art Unit 1794